

(19)



Europäisches Patentamt

European Patent Office

Office européen des brevets



(11)

**EP 0 963 836 A1**

(12)

## EUROPEAN PATENT APPLICATION

(43) Date of publication:  
15.12.1999 Bulletin 1999/50

(51) Int. Cl.<sup>6</sup>: **B30B 11/08**, B30B 15/32

(21) Application number: **98500229.4**

(22) Date of filing: **21.10.1998**

(84) Designated Contracting States:  
**AT BE CH CY DE DK ES FI FR GB GR IE IT LI LU  
MC NL PT SE**  
Designated Extension States:  
**AL LT LV MK RO SI**

(30) Priority: **12.06.1998 ES 9801307**

(71) Applicant: **J. BONALS, S.A.**  
**E-08940 Cornellà de Llobregat (ES)**

(72) Inventor:  
**Sitjar Canellas, Rafael**  
**08222 Terrassa (ES)**

(74) Representative:  
**Renter Llenas, Maria**  
**Consejo de Ciento, 347**  
**08007 Barcelona (ES)**

### (54) Rotary machines for the manufacture of tablets

(57) Improvements in rotary machines for the manufacture of tablets, consisting on a rotary assembly with multiple moveable rods that act in the corresponding formation chamber, provided with various outputs (8,9) for the tablets (10,11) produced around the periphery of the rotating portion of the machine, each of which outlets (8,9) receives the tablets (10,11) ejected from the

different formation chambers in a previously programmed sequence of activation of the individual ejection rods during the tablet ejection phase by selective action on the ejectors associated with the various punches fitted to the machine.

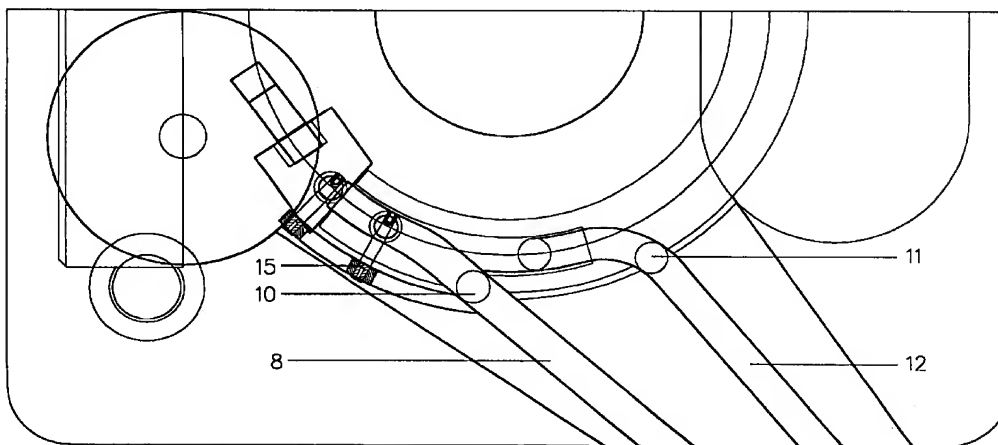


Fig. 1

EP 0 963 836 A1

## Description

[0001] The present invention refers to certain improvements in rotary machines for the manufacture of diverse types of tablets such as tablets of chemicals, food, pharmaceutical products, etc.

[0002] The type of machines to which this invention refers consist of an assembly or portion that rotates on a shaft that bears multiple elements to shape the tablets. These shaping elements are in turn made up of movable rods or punches, suitably guided in the rotary assembly and which move above a cylindrical formation chamber which receives the amount of material required to form the tablet, allowing the compression action to take place between the lower rods or punches and an upper counter-punch to form the tablet. The tablet is then ejected from the formation chamber via an output slide to continue to other stages of the production process, mainly packaging.

[0003] The improvements object of the present invention are designed to provide greater versatility in the operation of this type of machines and possible increases in their productivity.

[0004] In order to achieve these objectives, the machine described in this patent is fitted with means for pre-selecting, according to a determined distribution, the ejection of the tablets from the various shaping chambers in such a way that they be directed towards different production outputs. This system mainly consists of separate output slides for the manufactured tablets which direct them to different stations for packaging or handling. This provides an approach other than the current system of dividing the production of tablet making machines, and is especially useful for tablets that are not very consistent or fragile, increasing the effective production of the machine.

[0005] Therefore, the present improvements include the pre-selection of the ejection of the tablets according to a previously established program so that the different movable rods or punches that manufacture the tablets eject the same at a pre-determined position on the periphery of the rotary part of the machine. This assembly is fitted with various output slides for the finished tablets. The number of slides is not limited as it will solely depend on the previously determined ejection program.

[0006] Any means may be employed to move the compression punches or rods to one or the other position on the periphery of the rotary unit, hydraulic, pneumatic, electromagnetic or mechanical, although the currently preferred system, and the one referred to in this description, is mechanical as they are usually used in this type of machine. In the same way, even though the number of outputs is variable, the example given here will concentrate on two outputs as an example.

[0007] In the present embodiment, the improvements include the placement of separate means for activating the moveable rods, preferably by means of fixed cam surfaces placed in suitable positions, and forming sec-

tors of a circle which is concentric to the rotating assembly of the machine. The shape and relative placement of these cams enable the tablets to be ejected as programmed. These cams operate in combination with a system associated with the punches so that the punches eject the tablets when in contact with one or another of these fixed cams which, in turn, correspond to a selection of one or another of the multiple output slides. Two outputs in the case of the example described here.

[0008] The following is a description of a preferred embodiment of a rotary machine for the production of tablets, including the present improvements, based on the following figures:

Figure 1 shows a schematic top view of a machine incorporating the present improvements.

Figure 2 shows a side view of part of the same machine as shown in Figure 1.

Figure 3 shows a schematic view, with a partial section, of the rotary component of the machine.

[0009] The present improvements are described as an example of the mechanical operation of a machine for the production of tablets. However, as already mentioned, the scope of application is much wider, and includes other types of operation.

[0010] In the event of using mechanical means, the improvements are applicable to a machine that consists of a rotary assembly -1- fitted with a plate -2- that supports multiple moveable rods and punches -3- suitably guided in the plate and whose upper ends, usually enlarged into a compression head -4- fit inside cylindrical formation chambers -5- machined in an upper plate -6-. The whole assembly rotates on a vertical shaft shown shaded and indicated by reference number -7-.

[0011] Figure 2 shows part of the rotary unit -1-, as unwound on a plane, fitted with multiple rods -3-, -3'-, -3'', ..., whose heads -4- are housed inside the upper cylindrical chambers -5-. The controlled movement of these rods or punches -3-, -3'-, -3'', ..., determine a variation in the volume of the chamber -5- above the head -4- suitable for receiving the material which is then compressed by the combined action of the counter-punch or a blocking plate not shown in the Figures. This will then allow for sufficient compression to form each of the individual tablets which then enter the ejection area.

[0012] The present improvements consist of previous programming of the ejection stage of the different rods -3-, -3'-, -3'', ..., in such a way that the tablets produced are ejected in a predetermined manner into different outputs located at certain positions distributed around rotary assembly -1-. As shown in Figure 1, the example has two possible independent outputs -8- and -9- each consisting of an output slide that receive the tablets (indicated schematically by the numbers -10- and -11-)

expelled by the ejection stroke which takes place at a predetermined position on the periphery of rotary assembly -1-. This distribution enables the machine to be much more versatile as it may be used to manufacture tablets of different types which are ejected to the different output slides fitted to the machine, or even increase performance by ejecting tablets with the same composition from different outputs, enabling greater input to the final handling machines, usually packaging machines. The improvements object of this invention could also be applied to different types of packaging, with a different number of units per package.

**[0013]** In the case of the mechanical configuration shown in the drawings, the pre-selection of the action of the punches -3- could be made by various fixed cams mounted on a base -12- on which the rotary base -1- turns. This means that the ejection will take place when the punch -3- passes over each fixed cam placed in an angular distribution with the corresponding off-set between phases. For example, the fixed cam -13- is represented as formed by an inclined entry plane and a zone of maximum height and flat profile -14- which coincide with the side rollers -15- of the rods -3-, -3'-, -3''-, ..., destined to eject the tablet by one of the machine outputs. For example, Figure 2 shows the rods -3-, -3'-, -3''-, ..., fitted with side rollers that are operated by the fixed cams -13-, -14-. There is also another ramp also incorporating an inclined entry plane -16- and an area of flat profile -17- with an angular separation from the ramp -13-, -14-, and also with a radial separation to contact with the lower extremes of the rods -3- fitted with contact heads -18-. Figure 3 shows the radial separation between the fixed cam over which the heads -18- operate and the cam which activates the rollers -15- so that each has a separate and suitably co-ordinated action on the rods causing the tablets to be ejected in the correct sequence to one or the other output ramp fitted to the machine. Obviously the number of outputs may be varied in combination with the number of fixed cams and elements fitted to the moving rods.

**[0014]** Although the present invention has been described as, an example, having a mechanical configuration, it is to be understood that the invention is based on the location of various outputs for the tablets distributed in predetermined positions on the periphery of the rotating component of the machine, which outputs are designed to accept the tablets in a pre-programmed sequence so that each tablet is ejected into the corresponding output. Therefore, pre-selection may be programmed by mechanical means as described here, or using any other method as the rods may be activated by pneumatic, hydraulic, electromagnetic or any other means. In this case the system for programming the ejection will correspond to the action system used, including electromechanical and electronic systems.

## Claims

1. Improvements in rotary machines for the manufacture of tablets, consisting of a rotary assembly with multiple moveable rods that act in the corresponding formation chamber, characterised by the distribution of various outputs for the tablets produced around the periphery of the rotating portion of the machine, each of which outlets receives the tablets ejected from the different formation chambers in a previously programmed sequence of activation of the individual ejection rods during the tablet ejection phase by selective action on the ejectors associated with the various punches fitted to the machine.
2. Improvements in rotary machines for the manufacture of tablets according to Claim 1, applicable to the mechanical action of the individual punches, characterised by the location of various fixed cams with a radial separation at pre-determined angles on a fixed base located below the rotating assembly of the machine that act on different parts of the punches to cause ejection of the tablets in a predetermined order and corresponding to the different outputs of the tablets produced.
3. Improvements in rotary machines for the manufacture of tablets according to the preceding claims and characteristic because the rods are fitted with side rollers activated by fixed cams separated in a radial distribution.

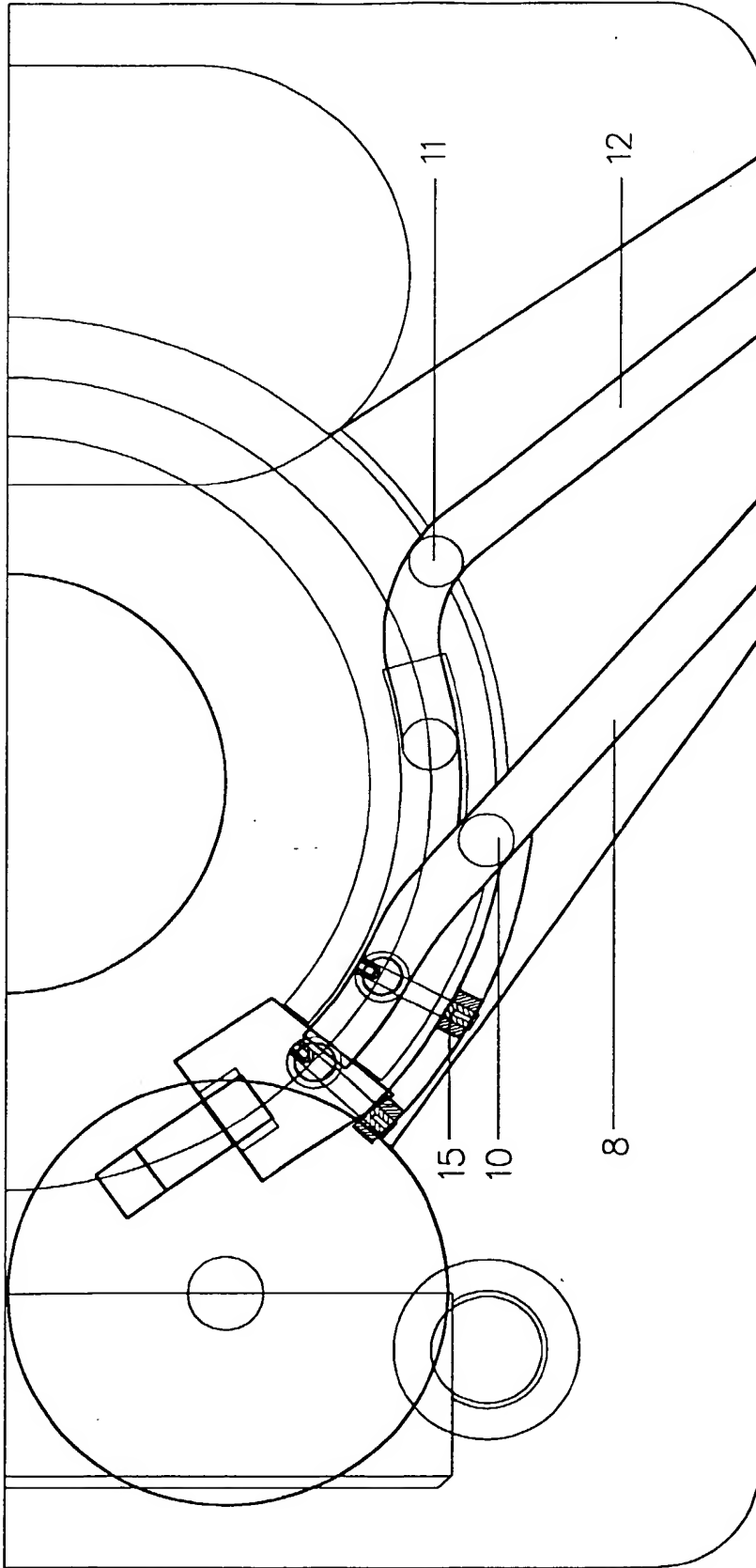


Fig. 1

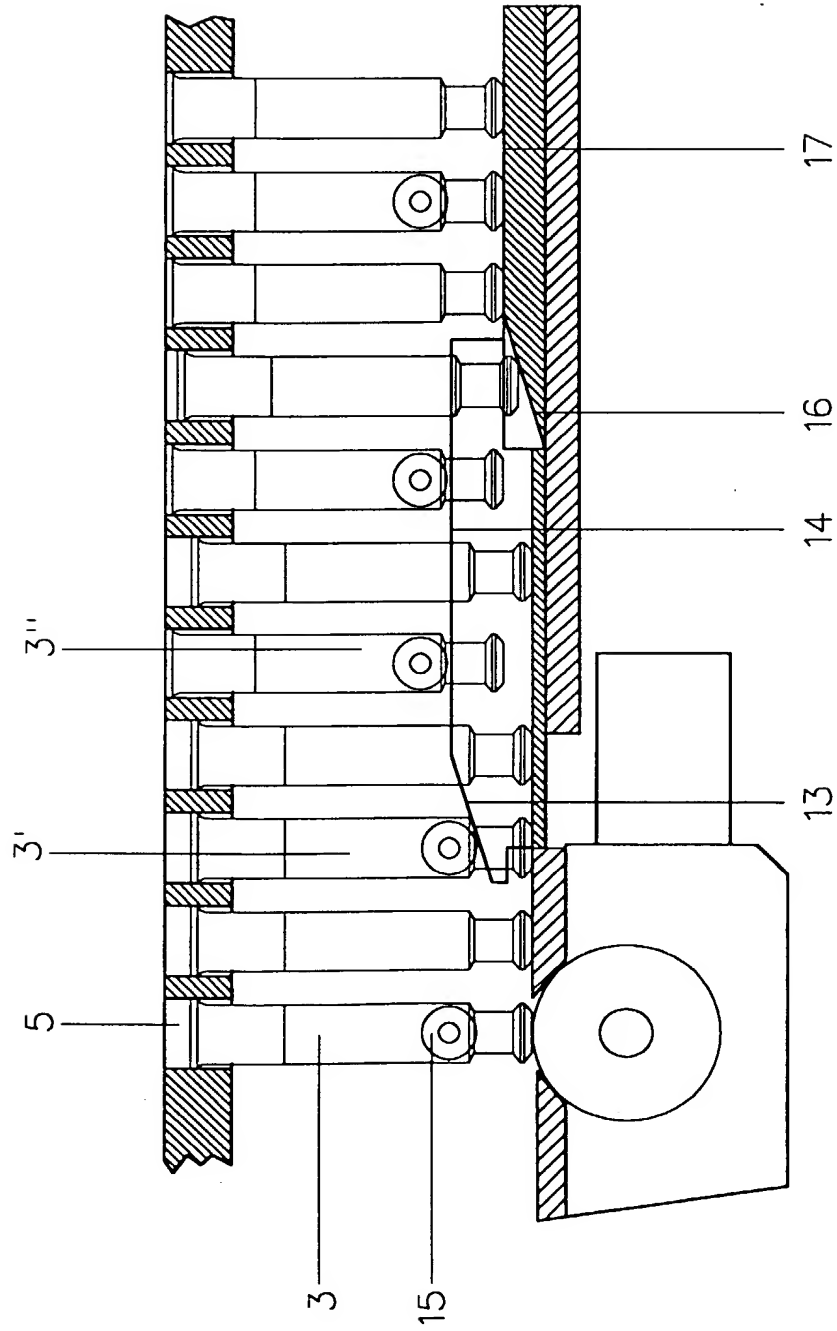


Fig. 2

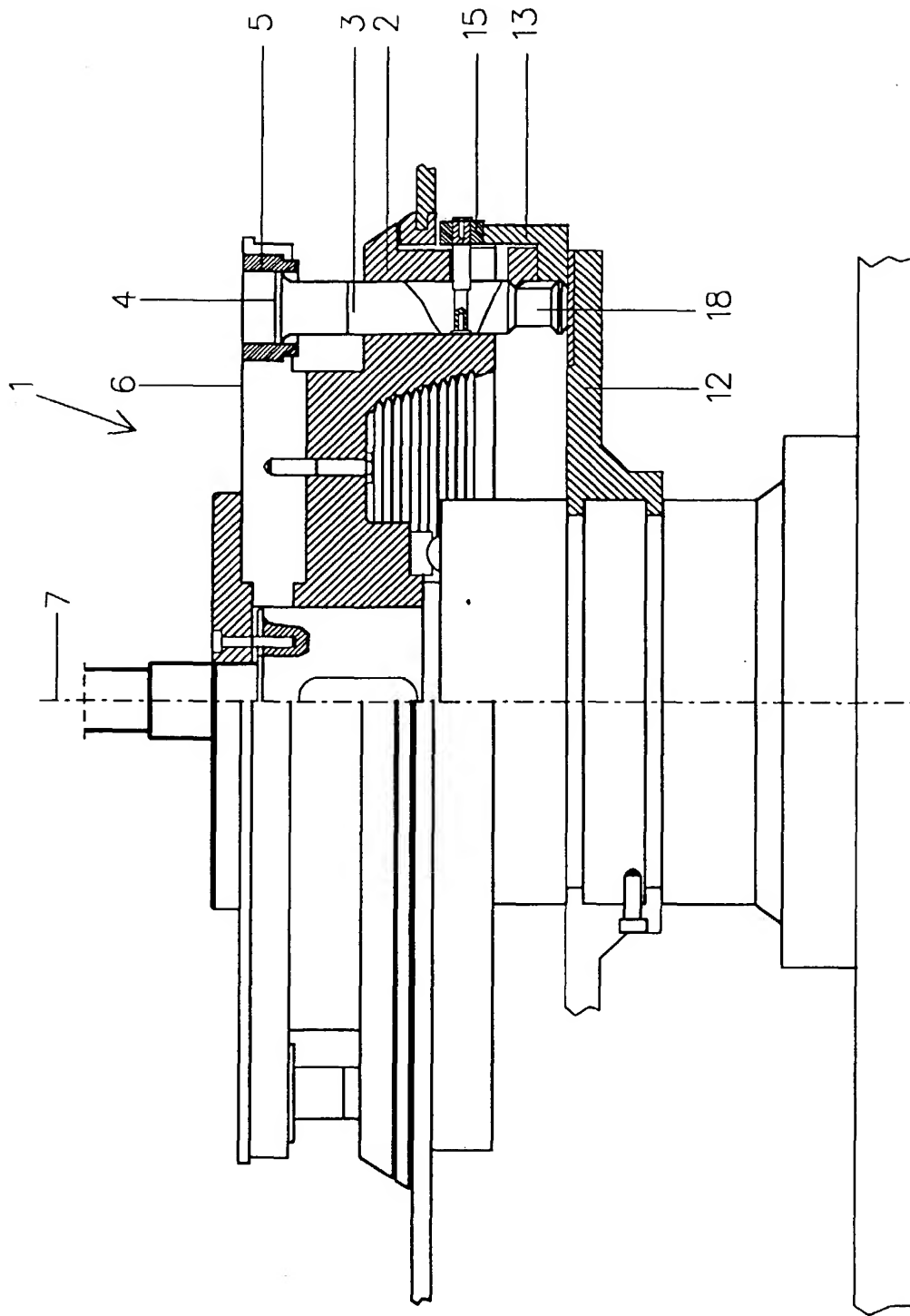


Fig. 3



European Patent  
Office

# EUROPEAN SEARCH REPORT

Application Number  
EP 98 50 0229

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
A	US 4 057 381 A (KORSCH WOLFGANG) 8 November 1977 (1977-11-08) * abstract; figures *	1-3	B30B11/08 B30B15/32
A	US 5 698 238 A (FABBRI DECEASED BRUNO GUIDO) 16 December 1997 (1997-12-16) * abstract; figures *	1-3	
A	US 4 253 811 A (HINZPETER JUERGEN ET AL) 3 March 1981 (1981-03-03) * abstract; figures *	1	
A	GB 1 053 639 A (KRUSE H.) 4 January 1967 (1967-01-04) * page 2, line 25 - line 34; figure 2 *	1,2	
A	PATENT ABSTRACTS OF JAPAN vol. 016, no. 195 (M-1246), 12 May 1992 (1992-05-12) & JP 04 028498 A (TAKEDA CHEM IND LTD), 31 January 1992 (1992-01-31) * abstract *	1	
A	PATENT ABSTRACTS OF JAPAN vol. 010, no. 187 (M-493), 2 July 1986 (1986-07-02) & JP 61 030605 A (TOYOTA MOTOR CORP), 12 February 1986 (1986-02-12) * abstract *	1	
A	EP 0 549 839 A (BONALS S A J) 7 July 1993 (1993-07-07) * figures 3,13 *	1	
The present search report has been drawn up for all claims			
Place of search <b>THE HAGUE</b>		Date of completion of the search <b>27 August 1999</b>	Examiner <b>Belibel, C</b>
<b>CATEGORY OF CITED DOCUMENTS</b> X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document	

EPO FORM 1503 03/82 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT  
ON EUROPEAN PATENT APPLICATION NO.**

EP 98 50 0229

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.  
The members are as contained in the European Patent Office EDP file on  
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

27-08-1999

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 4057381 A	08-11-1977	DE 2604648 B BE 851109 A	23-06-1977 31-05-1977
US 5698238 A	16-12-1997	IT 1264747 B DE 69405010 D DE 69405010 T EP 0732989 A WO 9515846 A JP 9506297 T	04-10-1996 18-09-1997 11-12-1997 25-09-1996 15-06-1995 24-06-1997
US 4253811 A	03-03-1981	NONE	
GB 1053639 A		NONE	
JP 04028498 A	31-01-1992	NONE	
JP 61030605 A	12-02-1986	NONE	
EP 0549839 A	07-07-1993	NONE	

EPO FORM P4459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82